



**International university of Africa**  
**Faculty of pure and applied science**  
**Department of mathematics and computer science**

**A new method to generate ordered  $n$ -tuples**

**Thesis submitted in partial fulfillment of  
the degree of M.SC. In mathematics**

By:

*Mohammed Fadi Almola Aldsiss Ahmed*

Supervisor:

Dr\ Mohamed Sayed Abd Elrahman

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# Verse

بسم الله الرحمن الرحيم

قال تعالى:

{إِقْرَأْ بِاسْمِ رَبِّكَ الَّذِي خَلَقَ} (١) {خَلَقَ الْإِنْسَانَ مِنْ عَلَقٍ}  
{(٢) اقْرَأْ وَرَبُّكَ الْأَكْرَمُ} (٣) {الَّذِي عَلَّمَ بِالْقَلَمِ} (٤) {عَلَّمَ  
الْإِنْسَانَ مَا لَمْ يَعْلَمْ} (٥)

{سورة العلق من الآية (١) إلى الآية (٥)}

# Dedication

I dedicate this research to my parents who have given me the help and love and encourage and supported me in my education we cannot have been made possible, and also I dedicate it to my staff of the faculty and my supervisor :

Dr\ Mohamed Sayed Abd Elrahman

Also to my friends for their supports

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Who the helped me to complete this research,  
special thank to the staff, libraries, and colleagues for  
their full support.

Finally I never forget my family who give me a best  
situation to complete my research.

## ABSTRACT

An ordered pair is a pair of objects, which means that the order which appears in the pair of objects is significant. The ordered pair is also called 2-tuples, the first aim of this research is to generate new ordered  $n$ -tuples from a system of  $k$  ordered  $n$ -tuples. The second aim of this research to determine the number of the new ordered  $n$ -tuples which generated from a system of  $k$  ordered  $n$ -tuples. Combinatorial analyses of the structure of the ordered  $n$ -tuples is performed via some elements of number theory and Combinatorics. Several new mathematical formulas are finally generalized and proven.

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